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TITLE :**HV320WXC-211****Product Specification****Rev. 0****SPEC. NUMBER**
S8-64-8A-011**PRODUCT GROUP**
TFT-LCD**REV.**
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REVISION HISTORY

REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
0		Initial Release	2012.03.29	Zhang HL

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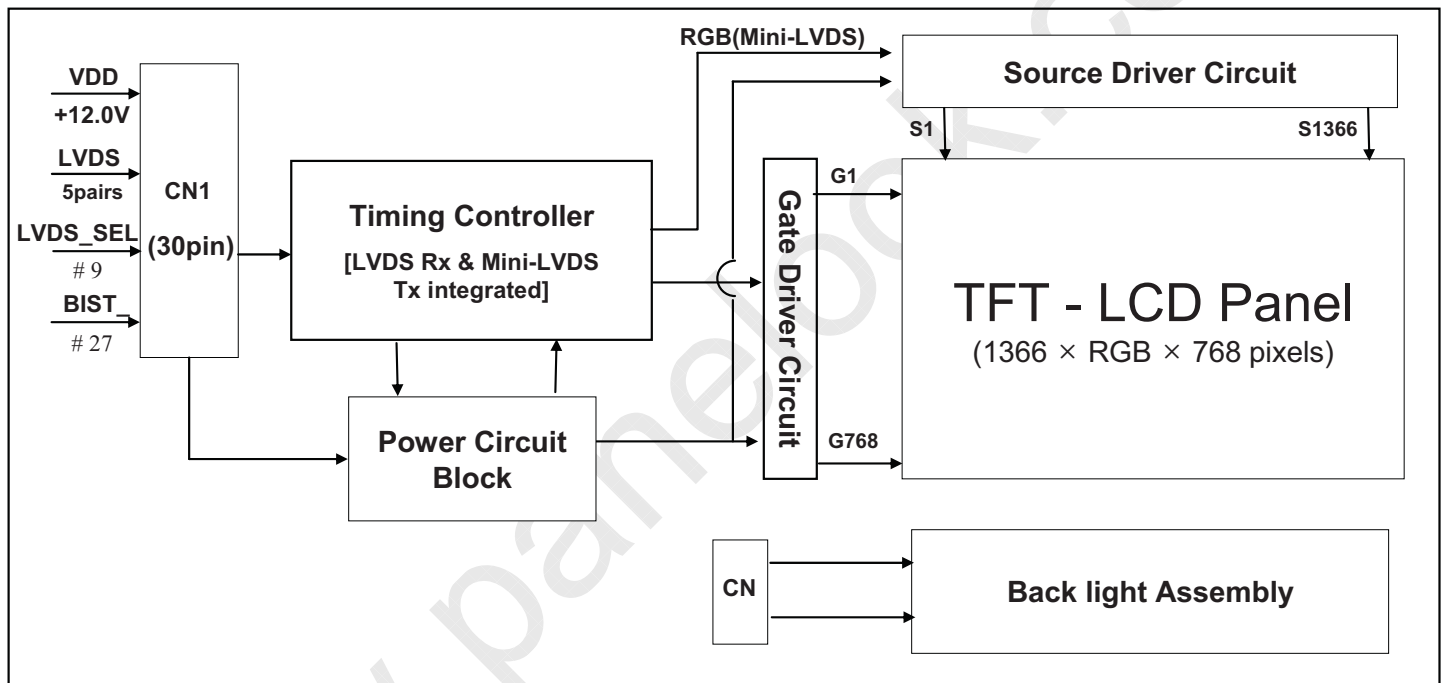
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1.0 GENERAL DESCRIPTION

1.1 Introduction

HV320WXC-211 is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 31.51 inch diagonally measured active area with WXGA resolutions (1366 horizontal by 768 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.



1.2 Features

- LVDS interface with 1 pixel / clock
- High-speed response
- Low color shift image quality
- 8-bit color depth, display 16.7M colors
- High luminance, low reflection and wide viewing angle
- DE (Data Enable) only mode
- iFFS technology is applied for high display quality
- RoHS compliant

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1.3 Application

- Home Alone Multimedia TFT-LCD TV
- Display Terminals for Control System
- High Definition TV(HD TV)
- AV application Products

1.4 General Specification

< Table 1. General Specifications >

Parameter	Specification	Unit	Remarks
Active area	697.685(H) × 392.256(V)	mm	
Number of pixels	1366(H) × 768(V)	pixels	
Pixel pitch	170.25(H) × RGB × 510.75(V)	μm	
Pixel arrangement	Pixels RGB Vertical stripe		
Display colors	16.7M(8bits-true)	colors	
Display mode	Transmission mode, Normally Black		
Outline Dimension	727.4(H) × 429(V) × 9.9(Body) typ.	mm	
Weight	5.2kg(max)	gram	
Power Consumption	Total=35.2.0Watt (Typ.) (Logic=4.0W, BL=31.2W)	Watt	
Surface Treatment	Haze 10%, 3H, Semi-glare treatment (Front Polarizer)		

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2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

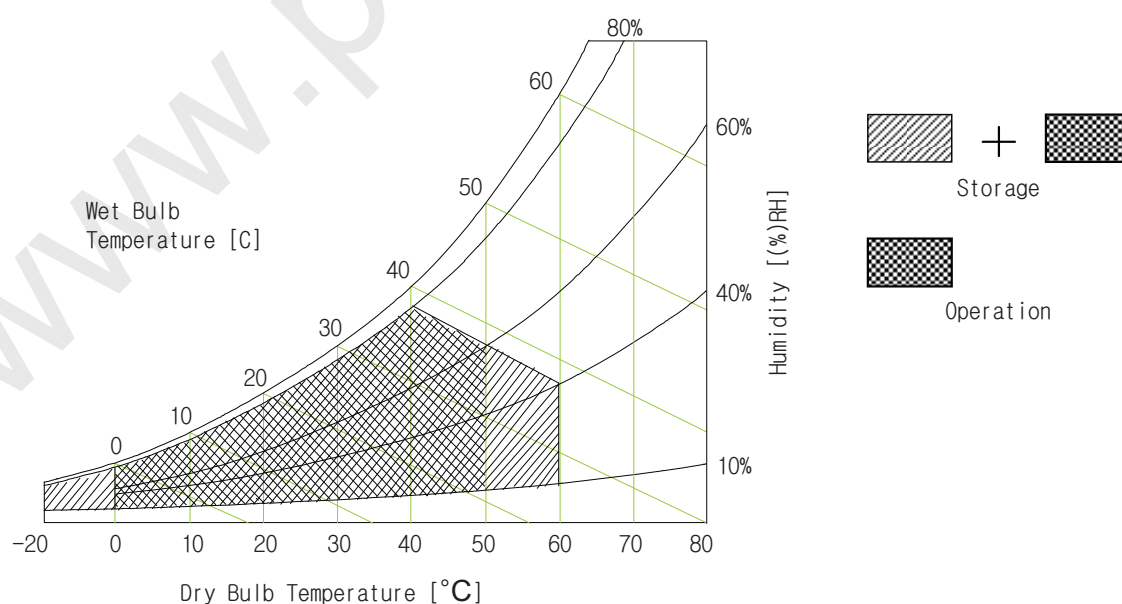
< Table 2. LCD Module Electrical Specifications >

[VSS=GND=0V]

Parameter		Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	LCD Module	VDD	VSS-0.3	13.2	V	Ta = 25 °C
Operating Temperature		T _{OP}	0	+50	°C	Note 1
		T _{SUR}	0	+70	°C	
Storage Temperature		T _{ST}	-20	+60	°C	
Operating Ambient Humidity		Hop	10	80	%RH	
Storage Humidity		Hst	10	80	%RH	

Note 1 : Temperature and relative humidity range are shown in the figure below.

Wet bulb temperature should be 39 °C max. and no condensation of water.



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3.0 ELECTRICAL SPECIFICATIONS

3.1 TFT LCD Module

< Table 3. LCD Module Electrical Specifications >

[Ta =25±2 ℃]

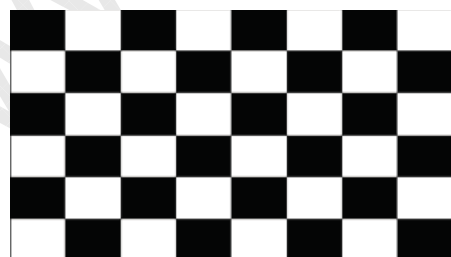
Parameter		Symbol	Values			Unit	Notes
			Min	Typ	Max		
Power Supply Input Voltage		VDD	10.8	12	13.2	Vdc	
Power Supply Ripple Voltage		VRP			300	mV	
Power Supply Current		IDD	-	333	592	mA	1
Power Consumption		PDD		4.0	7.1	Watt	
Rush current		IRUSH	-	-	3.0	A	2
LVDS Interface	Differential Input High Threshold Voltage	VLVTH	+100		+300	mV	
	Differential Input Low Threshold Voltage	VLVTL	-300		-100	mV	
	Common Input Voltage	VLVC	1.0	1.2	1.4	V	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3	V	
	Input Low Threshold Voltage	VIL	0	-	0.6	V	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=12.0V, Frame rate $f_v=60\text{Hz}$ and

Clock frequency = 75.4MHz. Test Pattern of power supply current

a) Typ : Mosaic 8 x 6 Pattern(L0/L255)



b) Max : Skip 1H2V Sub Dot Pattern(L0/L255)



2. The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

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4.0 INTERFACE CONNECTION

4.1 Module Input Signal & Power

- Connector : IS100-L30B-C23(Manufactured by UJU) or Equivalent.

< Table 5. LCM Module Input Connector Pin Configuration >

Pin No	Symbol	Description	Pin No	Symbol	Description
1	VDD	Power Supply +12.0V	16	RX1+	LVDS Receiver Signal(+)
2	VDD	Power Supply +12.0V	17	GND	Ground
3	VDD	Power Supply +12.0V	18	RX2-	LVDS Receiver Signal(-)
4	VDD	Power Supply +12.0V	19	RX2+	LVDS Receiver Signal(+)
5	GND	Ground	20	GND	Ground
6	GND	Ground	21	RCLK-	LVDS Receiver Clock Signal(-)
7	GND	Ground	22	RCLK+	LVDS Receiver Clock Signal(+)
8	GND	Ground	23	GND	Ground
9	LVDS_SEL	'L'=JEIDA , 'H'or NC= VESA	24	RX3-	LVDS Receiver Signal(-)
10	NC	No Connection	25	RX3+	LVDS Receiver Signal(+)
11	GND	Ground	26	GND	Ground
12	RX0-	LVDS Receiver Signal(-)	27	BIST	'L' or NC=Free run mode , 'H'= BIST mode
13	RX0+	LVDS Receiver Signal(+)	28	NC	No Connection
14	GND	Ground	29	NC	No Connection
15	RX1-	LVDS Receiver Signal(-)	30	GND	Ground

Notes : 1. NC(Not Connected) : This pins are only used for BOE internal operations.

2. Input Level of LVDS signal is based on the IEA 664 Standard.

3. LVDS_SEL : This pin is used for selecting LVDS signal data format.

If this Pin : High (3.3V) or Open (NC) → Normal NS LVDS format

Otherwise : Low (GND) → JEIDA LVDS format

4. BIST : This pin is used for selecting display pattern mode when input DE or input CLOCK quits toggling.

If this Pin : Low (GND) or Open (NC) → Free run mode(Black Pattern)

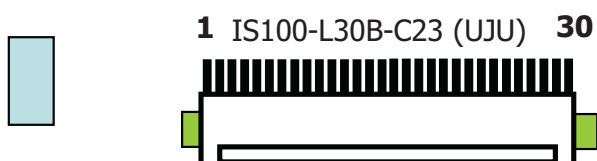
Otherwise : High (3.3V) → BIST mode(BIST Pattern)

Sequence : On = VDD ≥ LVDS Option , BIST Option ≥ Interface signal

Off = Interface signal ≥ LVDS Option , BIST Option ≥ VDD

Rear view of LCM

BIST Pattern



PT1: White (2 sec)	PT2: Black (2 sec)	PT3: Red (2 sec)	PT4: Green (2 sec)	PT5: Blue (2 sec)

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4.2 LVDS Interface

- LVDS Receiver : Timing Controller (LVDS Rx merged)

- LVDS Data : Pixel Data

< Table 6. LCM Module Input Connector Pin Configuration >

	LVDS Pin	Vesa Data format	JEIDA Data format	Remark
TxOUT/RxIN0	TxIN/RxOUT0	Red0 [LSB]	R2	
	TxIN/RxOUT1	Red1	R3	
	TxIN/RxOUT2	Red2	R4	
	TxIN/RxOUT3	Red3	R5	
	TxIN/RxOUT4	Red4	R6	
	TxIN/RxOUT6	Red5	R7 [MSB]	
	TxIN/RxOUT7	Green0 [LSB]	G2	
TxOUT/RxIN1	TxIN/RxOUT8	Green1	G3	
	TxIN/RxOUT9	Green2	G4	
	TxIN/RxOUT12	Green3	G5	
	TxIN/RxOUT13	Green4	G6	
	TxIN/RxOUT14	Green5	G7 [MSB]	
	TxIN/RxOUT15	Blue0 [LSB]	B2	
	TxIN/RxOUT18	Blue1	B3	
TxOUT/RxIN2	TxIN/RxOUT19	Blue2	B4	
	TxIN/RxOUT20	Blue3	B5	
	TxIN/RxOUT21	Blue4	B6	
	TxIN/RxOUT22	Blue5	B7 [MSB]	
	TxIN/RxOUT24	HSYNC	HSYNC	
	TxIN/RxOUT25	VSYNC	VSYNC	
	TxIN/RxOUT26	DEN	DEN	
TxOUT/RxIN3	TxIN/RxOUT27	Red6	R0 [LSB]	
	TxIN/RxOUT5	Red7 [MSB]	R1	
	TxIN/RxOUT10	Green6	G0 [LSB]	
	TxIN/RxOUT11	Green7 [MSB]	G1	
	TxIN/RxOUT16	Blue6	B0 [LSB]	
	TxIN/RxOUT17	Blue7 [MSB]	B1	
	TxIN/RxOUT23	Reserved	Reserved	

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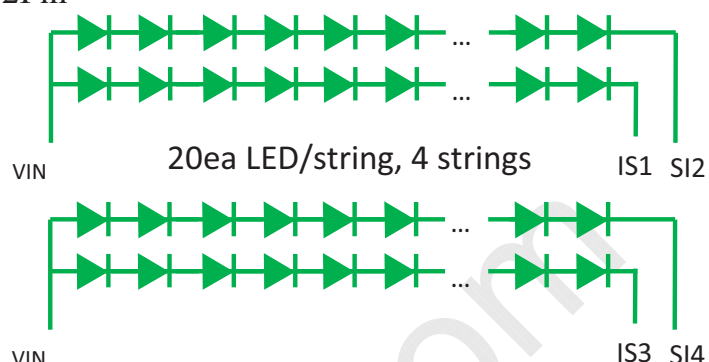
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4.3 LED Light Bar Input Power

-Connector :20022HS-12 or equivalent 2.0mm 12Pin



	Symbol	Values		Test Condition	Unit
Forward Voltage (Each String)	VF	Min	60	120mA	V
		Typ.	66		
		Max	72		
Power consumption	PLED	Min		28.8	W
		Typ.		31.2	
		Max		34.6	
Different Forward Voltage Between Strings		<1.8			V

Pin No	Symbol	Description
1	VIN	Power Supply
2	NC	NC
3	IS1	LED current sense signal 1
4	NC	NC
5	IS2	LED current sense signal 2
6	NC	NC
7	NC	NC
8	IS3	LED current sense signal 3
9	NC	NC
10	IS4	LED current sense signal 4
11	NC	NC
12	VIN	Power Supply

< Table 7. LED Light Bar Input Connector Pin Configuration >

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5.0 SIGNAL TIMING SPECIFICATIONS

5.1 Timing Parameters (DE only mode)

< Table 8. Timing Table >

ITEM	Symbol		Min	Typ	Max	Unit	Note
CLK	Period	t_{CLK}	11.8	13.3	17.9	ns	
	Frequency	-	56	75.4	85.0	MHz	
Hsync	Period	t_{HP}	1450	1560	2000	t_{CLK}	
	Frequency	f_H	39.4	48.4	55	KHz	
Vsync	Period	t_{VP}	778	806	1200	t_{HP}	
	Frequency	f_V	47	60	65	Hz	
Horizontal Active Display Term	Valid	t_{HV}	-	1366	-	t_{CLK}	
	Total	t_{HP}	1450	1560	2000	t_{CLK}	
Vertical Active Display Term	Valid	t_{VV}	-	768	-	t_{HP}	
	Total	t_{VP}	778	806	1200	t_{HP}	

Notes: This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

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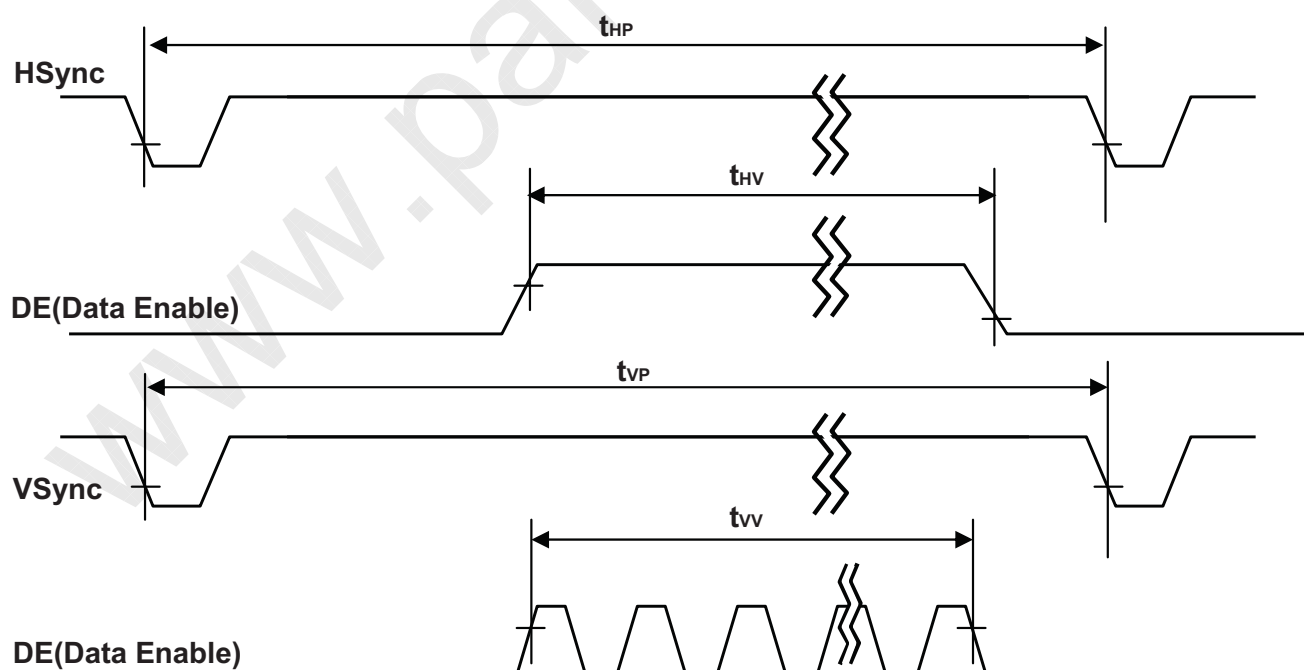
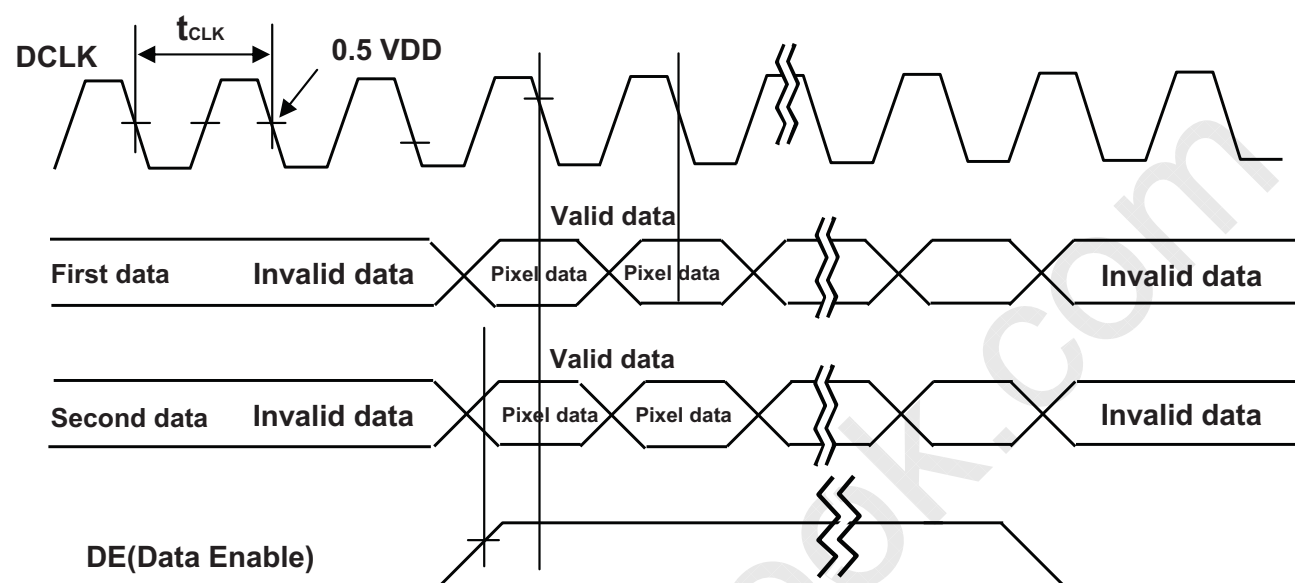
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5.2 Signal Timing Waveform



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5.3 Input Signals, Basic Display Colors & Gray Scale Of Colors

< Table 9. Input Signal and Display Color Table >

Color & Gray Scale		Input Data Signal																							
		Red Data								Green Data								Blue Data							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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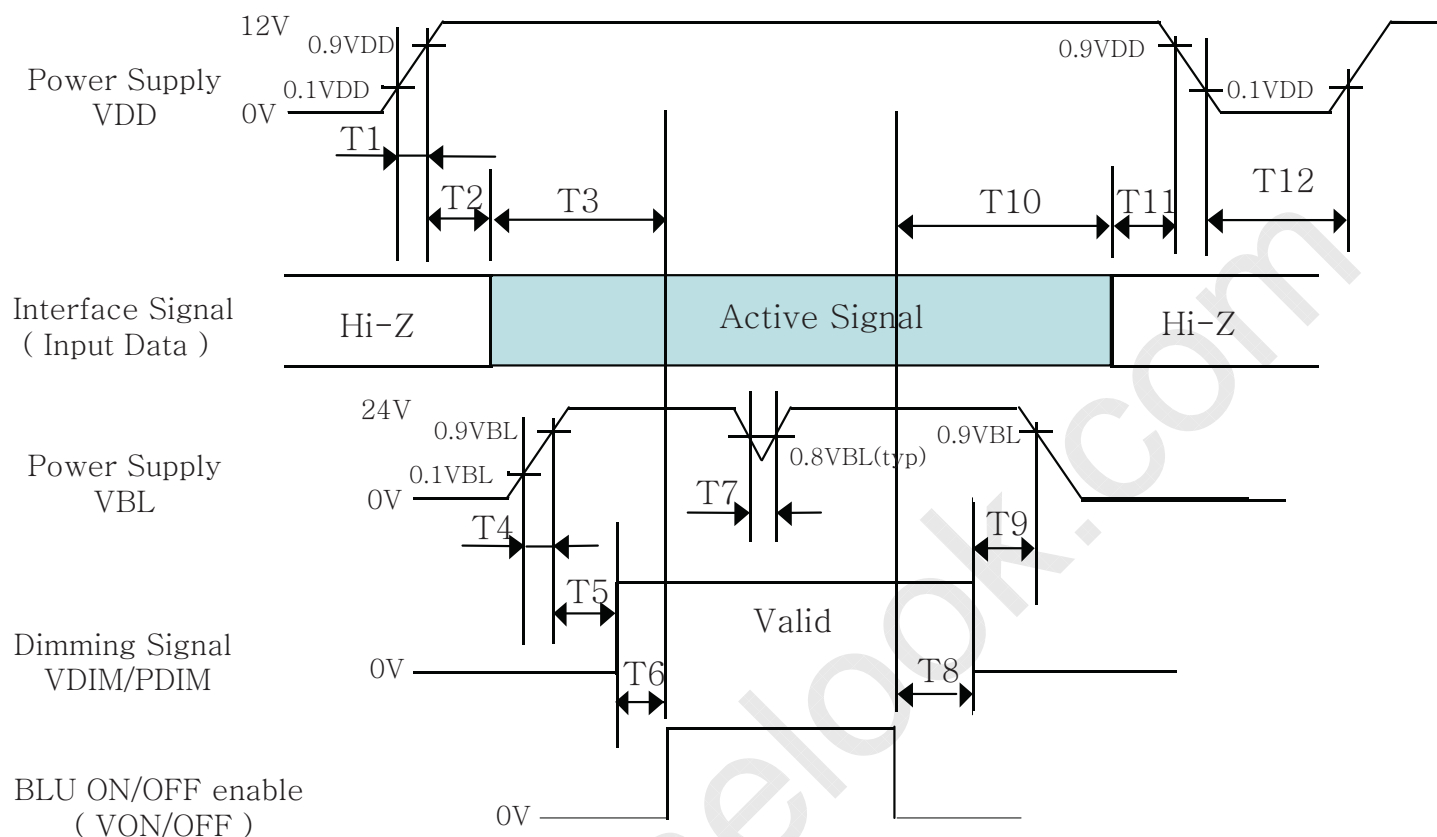
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5.4 Power Sequence



< Table 10. Sequence Table >

Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	20	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	20	-	-	ms
T5	500	-	-	ms
T6	0	-	-	ms
T7	-	-	10	ms
T8	0	-	-	ms
T9	500	-	-	ms
T10	200	-	-	ms
T11	0	-	50	ms
T12	1	-	-	s

Notes:

1. Even though T1 is over the specified value, there is no problem if I2T spec of fuse is satisfied.
2. Even though T4 is over the specified value, there is no problem if I2T spec of fuse is satisfied.
3. Back Light must be turn on after power for logic and interface signal are valid.

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6.0 OPTICAL SPECIFICATIONS

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25 \pm 2^\circ\text{C}$) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of Θ and Φ equal to 0° . We refer to $\Theta_{\Phi=0}$ ($=\Theta_3$) as the 3 o'clock direction (the "right"), $\Theta_{\Phi=90}$ ($=\Theta_{12}$) as the 12 o'clock direction ("upward"), $\Theta_{\Phi=180}$ ($=\Theta_9$) as the 9 o'clock direction ("left") and $\Theta_{\Phi=270}$ ($=\Theta_6$) as the 6 o'clock direction ("bottom"). While scanning Θ and/or Φ , the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 12.0V $\pm 10\%$ at 25°C . Optimum viewing angle direction is 6 'clock.

[VDD = 12.0V, Frame rate = 60Hz, Ta = $25 \pm 2^\circ\text{C}$]

< Table 11. Optical Table >

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Θ_3	CR > 10		89		Deg.	Note 1
		Θ_9			89		Deg.	
	Vertical	Θ_{12}			89		Deg.	
		Θ_6			89		Deg.	
Color Temperature				-	10000	-	K	
Color Gamut				-	72		%	
Contrast ratio		CR		900:1	1200:1	-		Note 2
Luminance of White		Y_w		300	350	-	cd/m ²	Note 3
White luminance uniformity		ΔY		75	-		%	Note 4
Reproduction of color	White	W_x		$\Theta = 0^\circ$ (Center) Normal Viewing Angle	TYP. - 0.03	0.280	TYP. + 0.03	
		W_y	0.290					
	Red	R_x	0.630					
		R_y	0.340					
	Green	G_x	0.300					
		G_y	0.630					
	Blue	B_x	0.148					
		B_y	0.068					
Response Time	G to G	T_g		-	8	10	ms	Note 6
Gamma Scale				2.0	2.2	2.4		

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Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
2. Contrast measurements shall be made at viewing angle of $\theta = 0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See Figure 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in Figure 2 for a total of the measurements per display.
4. The White luminance uniformity on LCD surface is then expressed as :
 $\Delta Y = (\text{Minimum Luminance of 5points} / \text{Maximum Luminance of 5points}) * 100$
 (See Figure 2 shown in Appendix).
5. The color chromaticity coordinates specified in Table 11. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
6. Response time Tg is the average time required for display transition by switching the input signal as below table and is based on Frame rate fV =60Hz to optimize.

Each time in below table is defined as Figure 3 and shall be measured by switching the

Measured Response Time	Target																
	0	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
Start	0																
	15																
	31																
	47																
	63																
	79																
	95																
	111																
	127																
	143																
	159																
	175																
	191																
	207																
	223																
	239																
	255																

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7.0 MECHANICAL CHARACTERISTICS

7.1 Dimensional Requirements

Figure 4 (located in Appendix) shows mechanical outlines for the model HV320WXC-211. Other parameters are shown in Table 12.

<Table 12. Dimensional Parameters>

Parameter	Specification	Unit
Dimensional outline	727.4(H) × 429 (V) × 9.9 (Body)	mm
Weight	5.2kg(max)	gram
Active area	697.685 (H) × 392.256(V)	mm
Pixel pitch	0.51(H) × 0.51(V)	mm
Number of pixels	1366(H) × 768(V) (1 pixel = R + G + B dots)	pixels
Back-light	Edge Type LED Backlight	

7.2 Mounting

See Figure 5. (Shown in Appendix)

7.3 Semi-Glare and Polarizer Hardness.

The surface of the LCD has an semi-glare coating to minimize reflection and a coating to reduce scratching.

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8.0 RELIABILITY TEST

< Table 13. Reliability Test Parameters >

No	Test Items	Conditions
1	High temperature storage test	Ta = 60 °C, 240 hrs
2	Low temperature storage test	Ta = -20 °C, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 °C, 80%RH, 240hrs
4	High temperature operation test	Ta = 50 °C, 240hrs
5	Low temperature operation test	Ta = 0 °C, 240hrs
6	Thermal shock	Ta = -20 °C ↔ 60 °C (0.5 hr), 100 cycle

Mechanical test need discuss with customer.

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9.0 Product Serial Number



1	2	3	4	5	6	7
X	X	X	X	X	X	X

1. Control Number

2. Rank / Grade

3. Line Classification

4. Year (2011 : 11, 2012 : 12, ...)

5. Month (1,2,3, ... , 9, X, Y, Z)

6. Internal Use

7. Serial Number

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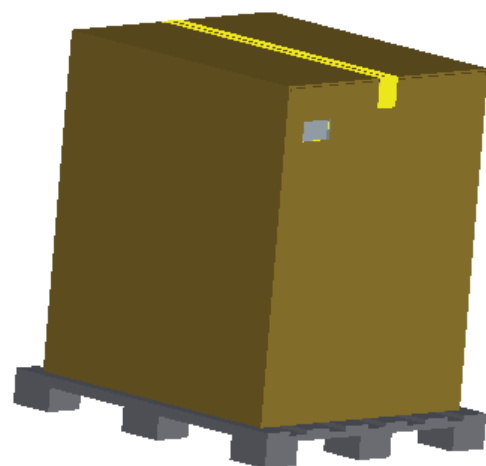
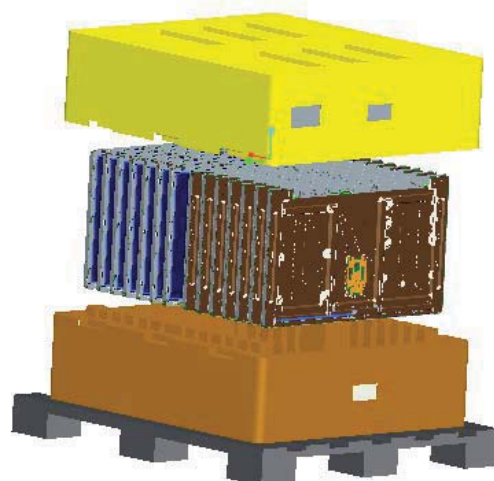
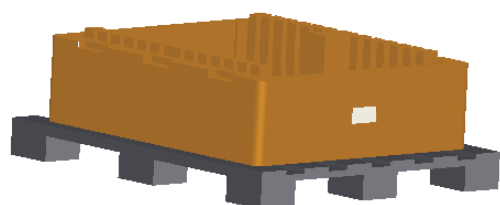
10.0 PACKING INFORMATION

BOE provides the standard shipping container for customers, unless customer specifies their packing information. The standard packing method and Barcode information are shown in below.

10.1 Packing Order

Put modules bundled with PE Bag into the inner EPS-box

Put inner EPS-lower on the pallet



Seal the box and stick label to the assigned area



Put the other EPS-box on the first

Original design package share with HV320WXC-200 for this Co-design business, which the original intention of this mode for in-house MP. If XM-MP requirement for a long time, need to pay sustained attention to the reliability of Packing

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10.2 Packing Note

- Box Dimension : 975 mm (L) × 870 mm (W) × 545 mm (H)
- Package Quantity in one Box : 14pcs

10.3 Box Label

- Label Size : 110 mm (L) × 55 mm (W)
- Contents

Model : HV320WXC-211

Q`ty : 14 Module in one box.

Serial No. : Box Serial No. See next page for detail description.

Date : Packing Date



00 0 00 0 0 000000
Type Grade Year Month ITEM-CODE Serial_no



XXXX

Internal CODE

RoHS Mark

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11.0 HANDLING & CAUTIONS**(1) Cautions when taking out the module**

- Pick the pouch only, when taking out module from a shipping package.

(2) Cautions for handling the module

- As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD module is operating.
- Put the module display side down on a flat horizontal plane.
- Handle connectors and cables with care.

(3) Cautions for the operation

- When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

(4) Cautions for the atmosphere

- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics

- Do not apply fixed pattern data signal to the LCD module at product aging.
- Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions

- Do not disassemble and/or re-assemble LCD module.
- Do not re-adjust variable resistor or switch etc.
- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

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12.0 APPENDIX

Figure 1. Measurement Set Up

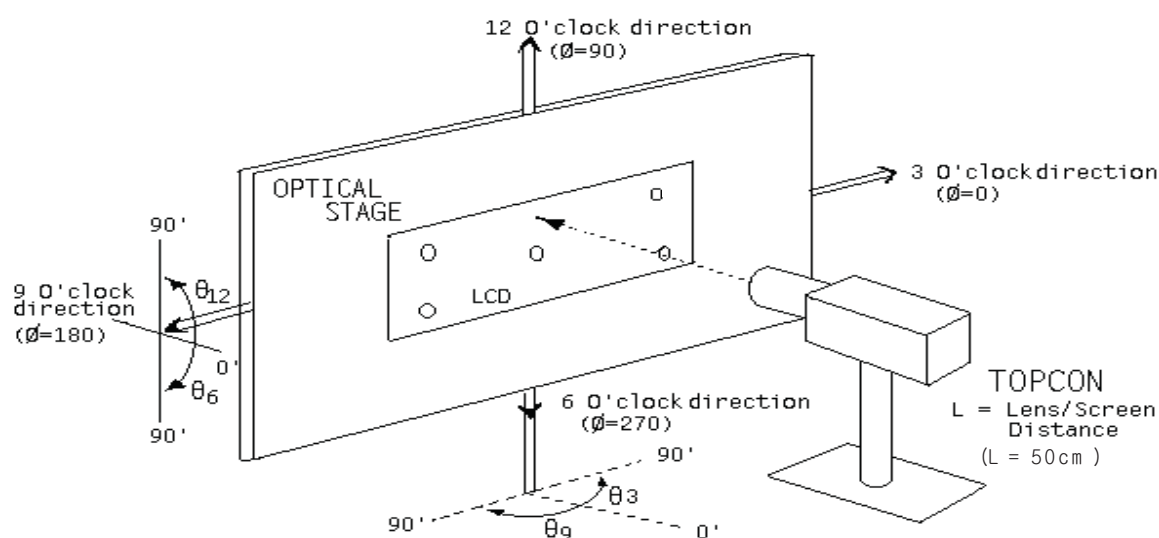
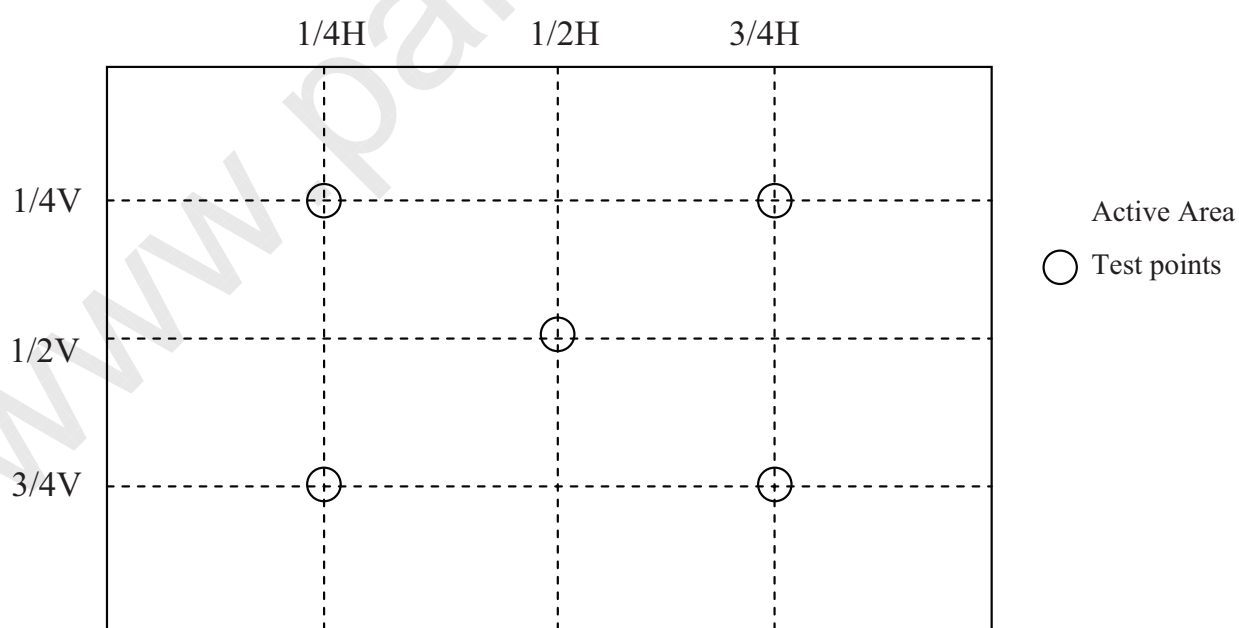


Figure 2. White Luminance and Uniformity Measurement Locations



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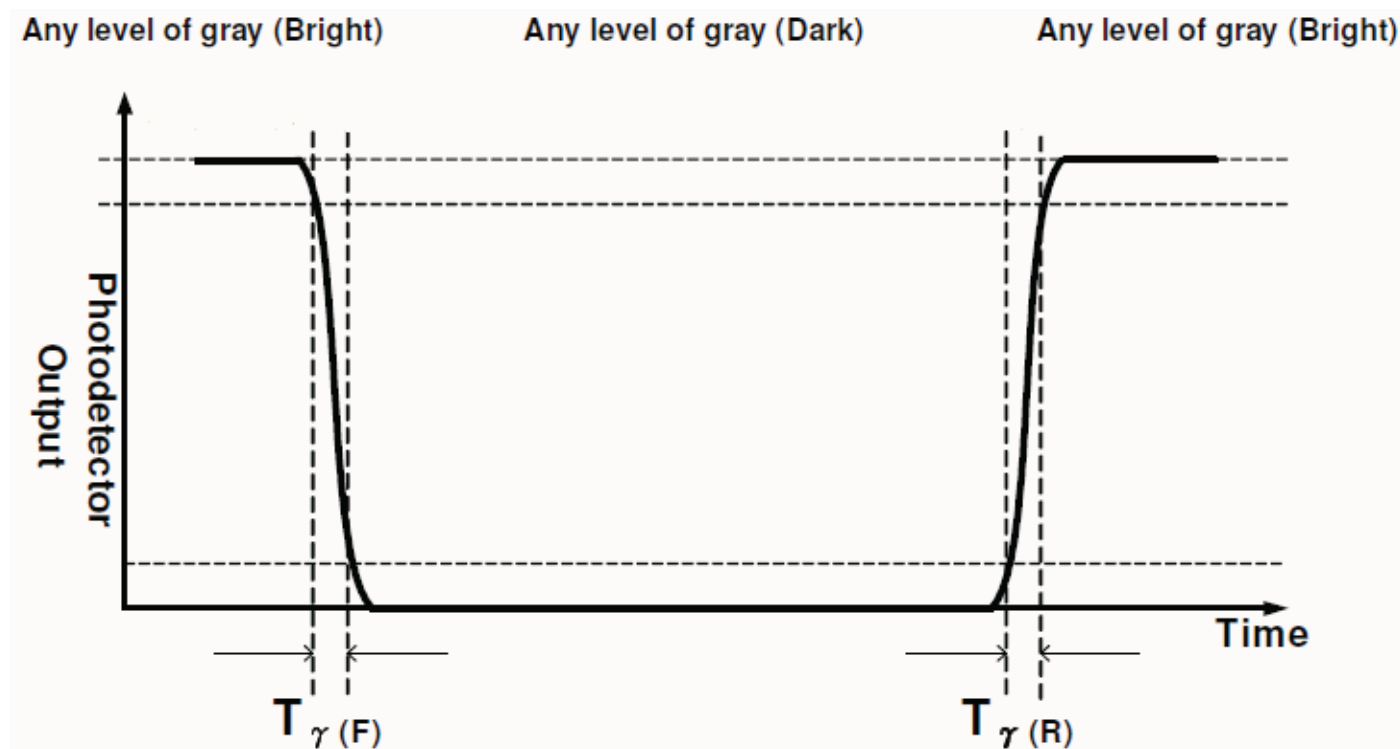
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Figure 3. Response Time Testing



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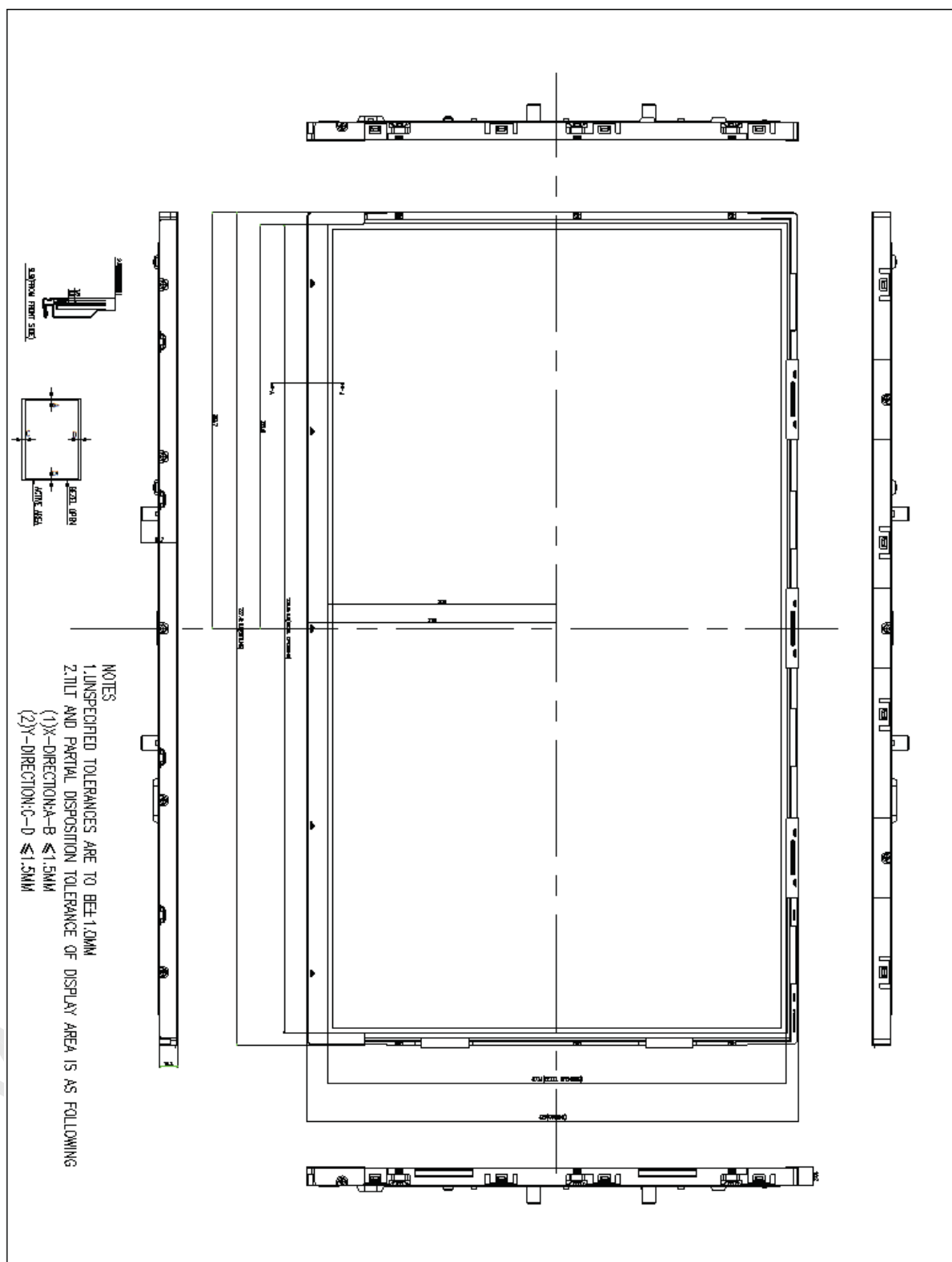
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Figure 4. TFT-LCD Module Outline Dimensions (Front view)



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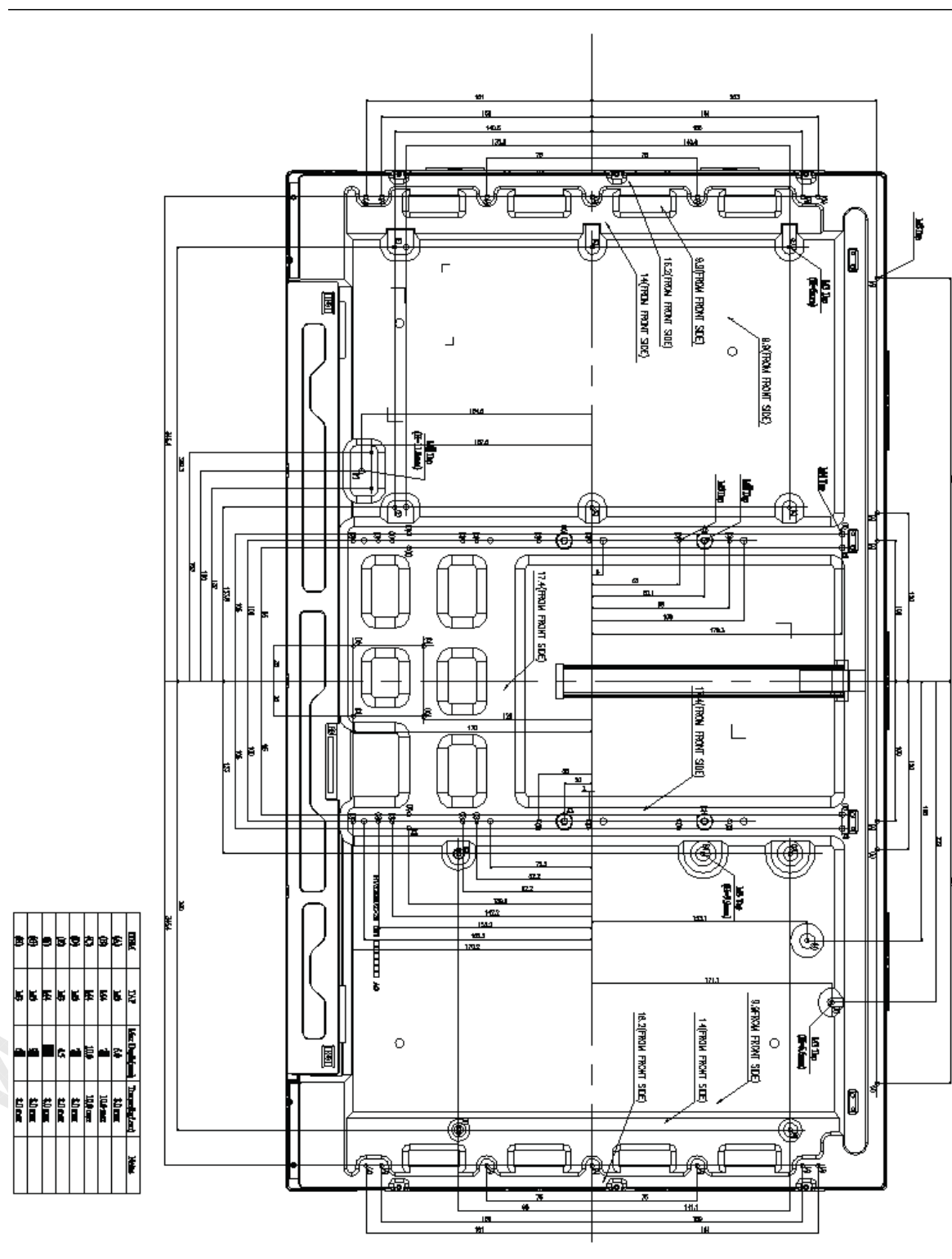
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Figure 5. TFT-LCD Module Outline Dimensions (Rear view)



Order	Unit	Material	Quantity	Price
001	100	100	100	100
002	100	100	100	100
003	100	100	100	100
004	100	100	100	100
005	100	100	100	100
006	100	100	100	100
007	100	100	100	100
008	100	100	100	100
009	100	100	100	100
010	100	100	100	100

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